REMARKS

Claims 1-7 are pending in this application. By this Amendment, claim 1 is amended. No new matter is added.

Entry of the amendments is proper under 37 CFR §1.116 since the amendments: (a) place the application in condition for allowance for the reasons discussed herein; (b) do not raise any new issue requiring further search and/or consideration; and (c) place the application in better form for appeal, should an appeal be necessary. Entry of the amendments is thus respectfully requested.

I. Personal Interview

The courtesies extended to Applicants' representative by Examiner Abdelwahed during the interview held August 31, 2005, are appreciated. The reasons presented at the interview as warranting favorable action are incorporated into the remarks below and constitute Applicants' record of the interview.

II. Claim Rejections Under 35 U.S.C. §103

Claims 1-5 are rejected under 35 U.S.C. §103(a) as unpatentable over JP 06179121 to Goto, in view of U.S. Patent No. 5,137,398 to Omori et al. (Omori) and U.S. Patent No. 6,881,475 to Ohtani et al. (Ohtani). The rejection is respectfully traversed.

None of the applied references, whether considered alone or in combination, disclose or suggest each and every feature recited in the rejected claims. For example, the combination of references fails to disclose or suggest a tap, comprising a body formed of high speed tool steel and having a threaded portion, wherein said threaded portion includes a chamfered portion provided by an axially distal end portion of said tap; and a complete thread portion contiguous to said chamfered portion in an axial direction of said tap, wherein a number of chamfered threads is not larger than 2.5 as counted along said axial direction, and said threaded portion is coated with a diamond-like carbon coating which has a fine amorphous structure and which has a thickness of not larger than 0.4 μm, as recited in amended claim 1.

As discussed in the Amendment filed on February 10, 2005 and during the personal interview, the Office Action fails to provide a proper basis for rejecting the claims under 35 U.S.C. §103 due to the reliance on Japanese-language reference of Goto. When an English-language Abstract of a foreign language reference is used to support a rejection, the evidence relied upon is the facts contained in the Abstract, not additional facts that may be contained in the underlying full text document. If the reference is in a language other than English and the Examiner seeks to rely on that document, a translation must be obtained so that the record is clear as to the precise facts the Examiner is relying upon in support of the rejection (see MPEP §706.02).

For example, the Office Action alleges that Goto discloses a number of chamfered threads not larger than 2.5 as counted along the axial direction. However, there is no such disclosure in the English-language Abstract of Goto of this feature. It appears that the Office Action relies only on the figures to form the basis of the rejection. However, for a picture to be relied upon, the picture must show all of the claimed structural features and how they are put together (see MPEP §2121.04). It is well established that patent drawings do not define the precise proportions of the elements and may not be relied upon to show particular sizes if the specification is silent on the issue (see MPEP §2125). As these arguments were made in the previous Amendment and there is no response to the arguments, relying on the same document and arguments to establish the rejection of claims 1-5 under 35 U.S.C. §103 is improper.

For example regarding claim 3 which recites that the number of chamfered threads is 1.5-2.0 as counted in the axial direction, without an English-language translation of the entire disclosure of Goto, even were the figure interpreted to disclose 2.5 chamfered threads in the tap, there is no way of ascertaining whether the figure of Goto requires that there must be at least 2.5 threads or no more than 2.5 threads. Thus, if Goto were to disclose that there must be at least 2.5 threads, Goto would not disclose or suggest the additional feature recited in claim 3, i.e., 1.5-2.0 chamfered threads.

Thus, because an English-language translation has not been provided and Goto is continued to be relied upon as the primary reference in rejecting the claims, Applicants submit that the final rejection of this application is premature and request that the final rejection be withdrawn until at least such time as an English-language translation of Goto is provided which shows each and every feature as alleged in the Office Action.

It is also admitted in the Office Action that Goto fails to teach the threaded portion being coated with a "diamond-like carbon which has a fine amorphous structure and which has a thickness of not larger than 0.4 μm." To address this deficiency, the Office Action again combines Omori as in the previous Office Action, for its teaching of a diamond-coated drill bit.

As argued in the previous Amendment, there is no motivation or suggestion in either of the references, or to one of ordinary skill in the art, to make the combination as proposed in the Office Action. As this argument was not responded to in this Office Action, Applicants submit that the repeated rejection of the claims under the combination of Omori and Goto is improper.

Furthermore, Omori relates to a drill bit having a diamond coating. As is well known to those skilled in the art, a drill bit and a tap are completely different tools to be used for completely different purposes. For example, a drill bit is used to originate or enlarge a hole in the workpiece whereas a tap is used to form an internal thread in an inner circumferential surface of a hole. Therefore, a drill bit and a tap have different structural features.

Even were such a combination made, there is no suggestion or motivation to modify the tap disclosed in Goto with a diamond coating as taught by Omori. For example, Omori specifically discloses a drill bit having a diamond coated sintered body. In contrast, the claims recite a tap having a threaded portion coated with a diamond-like carbon coating which has a fine amorphous structure. The diamond-like coating (DLC) having a fine amorphous structure is defined in the specification as having a crystallographically different from diamond. Accordingly, a diamond-like coating does not correspond to the diamond coating disclosed in Omori.

The Office Action also combines Ohtani for the teaching of an amorphous coating that can be used in coating taps. However, even with the combination of Ohtani, the diamond coating of Omori does not become amorphous. As pointed out in the previous Amendment, the term amorphous is defined as "pertaining to a solid which is non-crystalline, having neither definite form or structure" (emphasis added) (see the McGraw Hill Dictionary of Science and Technical Terms). Therefore, combining Ohtani with Omori cannot render a diamond coating amorphous since a diamond has a well known crystalline structure.

Additionally, Ohtani does not specifically teach the use of an amorphous carbon coating in a tap. Although Ohtani does disclose that an amorphous carbon coated tool can be used in a tap (see col. 8, line 64 - col. 9, line 2) the mere mention of an amorphous coating on a tap does not teach a threaded portion of a tap having a diamond-like carbon coating which has an amorphous structure and a thickness of not larger than 0.4 μm.

Finally, there is no motivation or suggestion to combine either Omori or Ohtani as alleged in the Office Action. For example, it is well understood by one of ordinary skill in the art that a tapping operation (thread forming operation using a tap) is very different from other cutting operations such as drilling, milling, turning, boring and reaming, in that tapping has to be carried out at a cutting speed at a rate much lower than other cutting processes. For example, as shown in Tables 7-10 of Ohtani, the cutting speeds in the drilling, reaming and milling operation made to aluminum-based material are as high as 100-300 m/minute. In contrast, in Fig. 4B of this application, it is shown that the cutting speed in a tapping operation made to an aluminum-based material is as low as 30 m/minute. Such a large discrepancy in cutting speeds between a tapping and other cutting processes is due to the fact that a feed rate in a tapping operation is dependent upon a pitch of the internal thread that is to be formed in the operation (namely, a feed amount per 1 revolution of the tap has to be equal to the lead or pitch of the internal thread that is to be formed in the operation). Thus, the cutting speed in a tapping operation has to be at a rate low enough to prevent the tap from being fed in an excessively high feed rate to prevent breakage of the tap. Accordingly, one of ordinary skill in the art would not have been motivated to combine the tap of Goto with either the drill bit of Omori or the teachings of Ohtani, as the references fail to disclose or suggest a tap with an amorphous structure nor a cutting condition at which the thread forming operation can be carried out by such a tap with the amorphous structure as recited in the claims.

Regarding claim 4, even were the combination of references made, the resulting combination still fails to disclose the additional features recited in claim 4. For example, Omori is relied upon for the disclosure of a diamond coated drill bit having a thickness as taught by the Applicants, i.e., "not larger than 0.4 μm". However, as clearly recited in Omori, the diamond coating layer must be at least 0.1 μm in thickness (see col. 4, line 40; col. 4, lines 57-59 and col. 5, line 50). Furthermore, Omori specifically discloses that if the thickness of the diamond coating is less than 0.1 μm, it is impossible to attain the effects of wear resistance and deposition resistance by the diamond coating. However, as the thickness of the diamond coating on a drill bit fails to correspond to a thickness of a diamond-like amorphous coating on a tap, Omori fails to disclose this feature. Accordingly, Omori fails to disclose or suggest the additional features recited in claim 4.

As none of the applied references disclose or suggest a tap having a threaded portion formed of a high speed tool steel, the combination of references fails to disclose each and every feature recited in the claims as amended. Furthermore, the combination of references does not disclose or suggest the threaded portion formed of high speed tool steel and coated with a diamond-like carbon coating which has an amorphous structure. For example, Goto is silent about the material from which the tap is made. Both Ohtani and Omori disclose a WC-based cemented carbide body rather than a body of high speed tool steel. For these, and the additional reasons discussed above, withdrawal of the rejections of claims 1-5 under 35 U.S.C. §103(a) is respectfully requested.

Claim 6 is rejected under 35 U.S.C. §103(a) as unpatentable over Goto in view of Omori and Ohtani and further in view of U.S. Patent No. 5,213,454 to Givler et al.; and claim 7 is rejected under 35 U.S.C. §103(a) as unpatentable over Goto in view of Omori and Ohtani and further in view of U.S. Patent No. 4,597,697 to Shaffer. The rejections are respectfully traversed.

Claims 6 and 7 are allowable for at least their dependency on independent claim 1 for the reasons discussed above, as well as the additional features recited therein. Accordingly, withdrawal of the rejection of claims 6 and 7 under 35 U.S.C. §103(a) is respectfully requested.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

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